Warren J. Baker Endowment
for Excellence in Project-Based Learning
Robert D. Koob Endowment *for Student Success*

FINAL REPORT

Final reports will be published on the Cal Poly Digital Commons website (http://digitalcommons.calpoly.edu).

I. Project Title
Team 35 - Maize Mill

II. Project Completion Date
June 2nd, 2017

III. Student(s), Department(s), and Major(s)
(1) Jose Delgado, Mechanical Engineering Dept., Mechanical Engineering
(2) Chad Steese, Mechanical Engineering Dept., Mechanical Engineering
(3) Wes Curtis, Mechanical Engineering Dept., Mechanical Engineering

IV. Faculty Advisor and Department
Eileen Rossman, Mechanical Engineering Dept.

V. Cooperating Industry, Agency, Non-Profit, or University Organization(s)
Geoffrey Wheeler and Engineering Without Borders

VI. Executive Summary

Engineers Without Borders (EWB) has worked on several projects to help developing communities around the world build the infrastructure necessary for modern life. One of their projects is the creation of an inexpensive and easily manufactured maize mill that communities in Africa (mainly Malawi) can use to grind corn and make their main food source, Nsima. Geoffery Wheeler, an accomplished engineer and former mentor to EWB's Malawi team, wants an inexpensive, easily manufacturable and effective maize mill that can be fabricated and sustained in Africa.

The report discusses the process in which the Maize Mill Senior Project team created the Maize Mill design and prototype. The report is written in a way that the reader will see the steps taken to complete the senior project. Included are the background research done on different types of mills, the ideation sessions, design selection, analysis techniques, design calculations, drawings, prototype manufacturing and testing.

Ultimately the testing of the finished prototype indicated that the design must be altered in order for the Maize Mill to operate under the desired specifications. This design iteration will hopefully be carried out by Cal Poly's Engineers Without Borders organization or future senior project groups.

VII. Major Accomplishments

(1) Through this senior project we were able to successfully research the manufacturing capabilities of Africa and design a maize mill that could be easily manufactured there.
(2) Though the first design proved to be unsuccessful due to the flowrate of the auger we were able to design and cast a second auger to fix those issues.
(3) The burr plates from the initial design proved to be strong and fine enough to produce some acceptable flour. Only issues regarding clamping force caused unacceptable flour grain size.

VIII. Expenditure of Funds

Final Bill of Materials		
Store	**Location**	**Price**
Metal Depot	Aluminum Block	$140.39
Fastenal	1.5" Drill Bit	$131.95
McMaster Carr	0.5" Shaft Coupling	$41.57
Home Depot	Plywood	$31.00
Miners	Nuts and bolts	$29.60
Fastenal	Bearing	$20.36
Home Depot	Brackets and Screws	$15.09
Home Depot	Sheet Metal	$11.29
Home Depot	Acrylic Sheet	$5.12
Home Depot	Liquid nails Glue	$3.00
Cal Poly	Cardboard Poster	$1.45
	Total	**$430.82**

$430.73 of $950

IX. Impact on Student Learning

Through this project we were able to follow a project through all aspects of creation starting from researching the problem and customer to testing a prototype and finally writing recommendations for future projects similar to ours. Through the design process we learned that communication with and research on Africa were essential since all our parts must be accessible and manufacturable there. Once completing our prototype there was a strong appreciation for tolerances and also for designing extra material for post processing.